American Water Works Association

Dedicated to the World's Most Important Resource℠

Webinar Info AWWA will complete

Introduction to PFOA/PFOS Health Advisory

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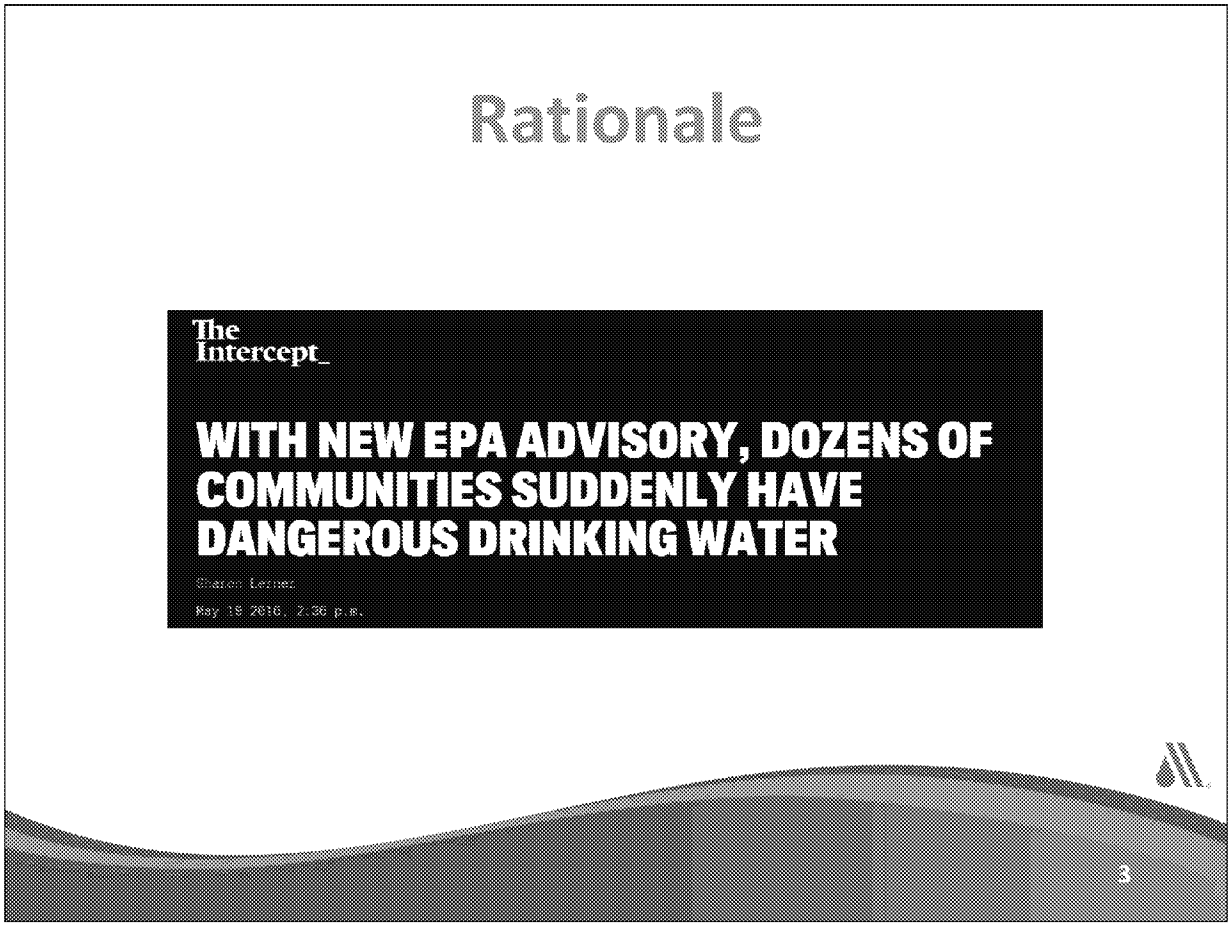
Rationale



https://theintercept.com/2016/05/19/with-new-pfoa-drinking-water-advisory-dozens-of-communities-suddenly-have-dangerous-water/

Learning Objectives

- Explain why EPA issued PFC health advisories.
- Discuss implications of PFC health advisories for your water system.

Agenda

- What compounds are being managed?
- What got us to where we are today?
- What is the PFC health advisory?
- What are the implications of the PFC health advisory?

Which Compounds?

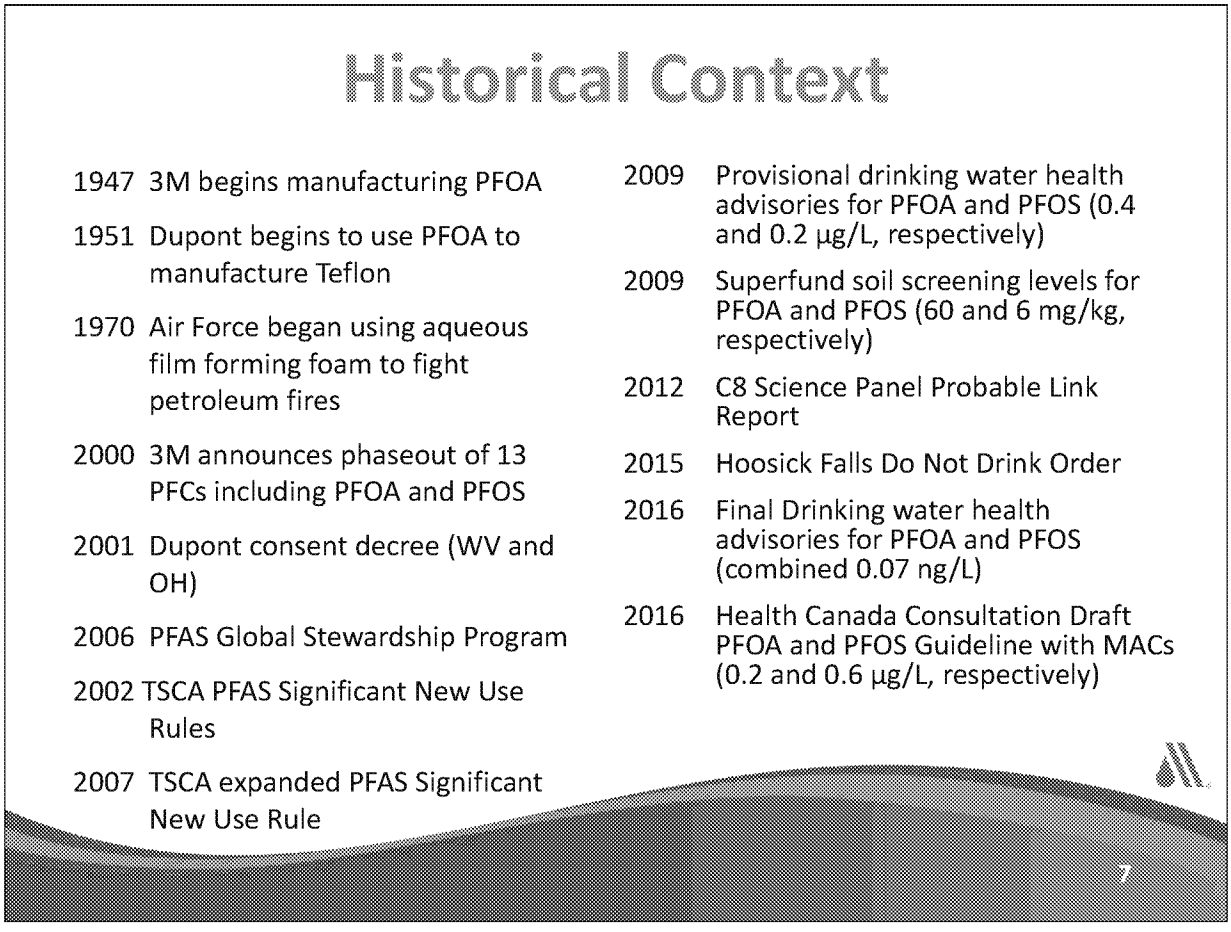
Perfluoroalkyl carboxylic acids (PFCAs)

Individual chemical name	Acronym	UCMR
Perfluorobutanoic acid	PFBA	
Perfluoropentanoic acid	PFPeA	
Perfluorohexanoic acid	PFHxA	
Perfluoroheptanoic acid	PFHpA	x
Perfluorooctanoic acid	PFOA	x
Perfluorononanoic acid	PFNA	x
Perfluorodecanoic acid	PFDA	
Perfluorundecanoic acid	PFUnA	
Perfluorododecanoic acid	PFDoA	
Perfluorotridecanoic acid	PFTrDA	
Perfluorohexadecanoic acid	PFHxDA	
Perfluorooctadecanoic acid	PFOcDA	

Perfluoroalkyl sulfonic acids (PFSAs)

Individual chemical name	Acronym	UCMR
Perfluorobutane sulfonic acid	PFBS	x
Perfluoropentane sulfonic acid	PFPeS	
Perfluorohexane sulfonic acid	PFHxS	x
Perfluoroheptane sulfonic acid	PFHpS	
Perfluorooctane sulfonic acid	PFOS	x
Perfluorononane sulfonic acid	PFNS	x

Source: Adapted from ASTDR, The family tree of perfluoroalkyl and polyfluoroalkyl substances (PFAS)



2001 Dupont Consent Decree – C8 (PFOA) > 14 ppb and Dupont must provide alternative water

SNUR for 13 initial PFAS chemicals and another 75

2009 Provisional health advisories

https://archive.epa.gov/pesticides/region4/water/documents/web/pdf/2009_01_15_criteria_drinking_pha-pfoa_pfos.pdf

2009 Screening levels

https://archive.epa.gov/pesticides/region4/water/documents/web/pdf/final_pfc_soil_screening_values11_20_09.pdf

SNUR another 183 PFAS chemicals

By the end of 2007 TSCA is being use to limit use of 271 perfluoroalkane sulfonates

Probably Link Report -- http://www.c8sciencepanel.org/prob_link.html

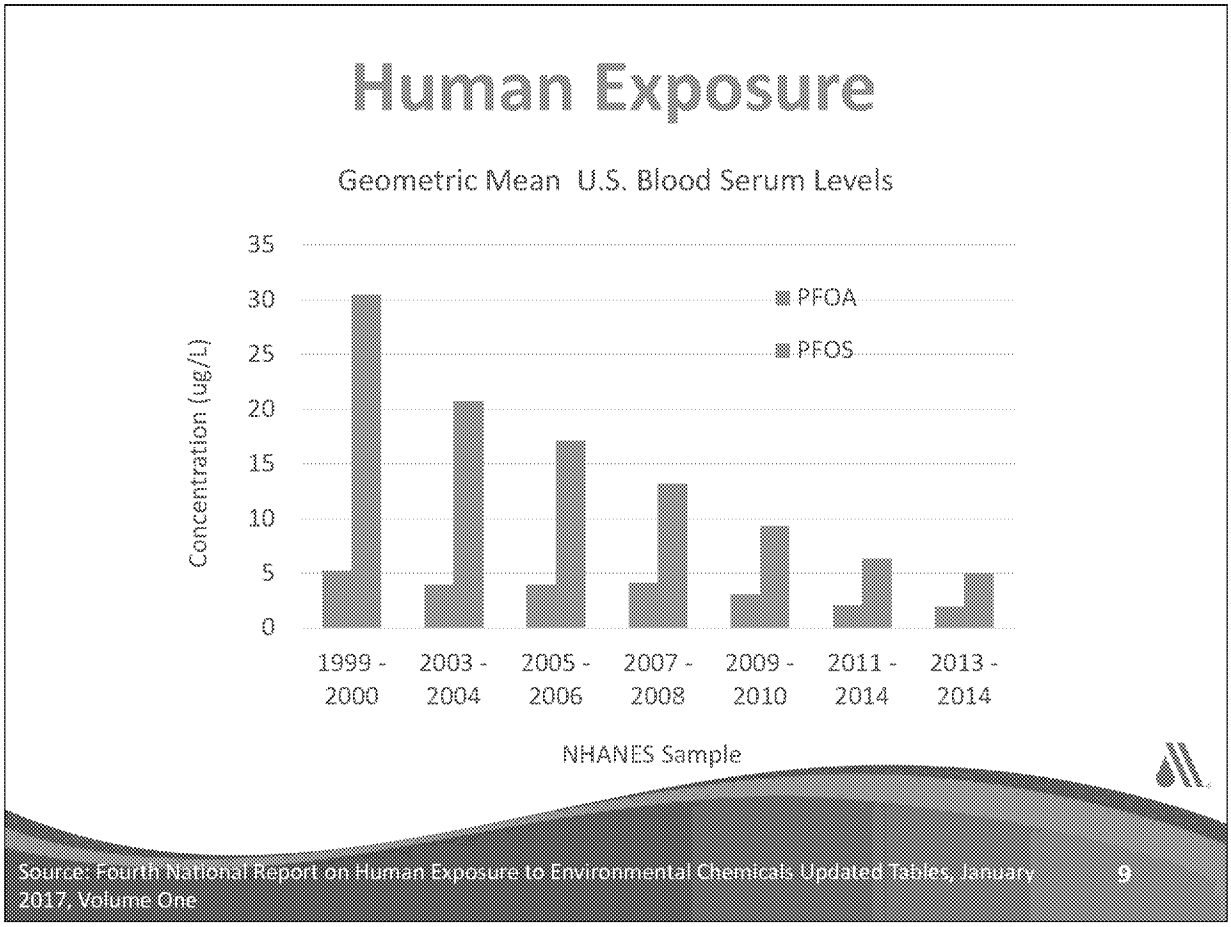
Science Panel concluded that there was a Probable Link to C8 exposure: diagnosed high cholesterol, ulcerative colitis, thyroid disease, testicular cancer, kidney cancer, and pregnancy-induced hypertension

PFAS Stewardship Program

Participating Manufacturer	2006 - 2013 % Reduction in Product Content	2013 All Releases to Environment from US Manufacture
Arkema	96 – 100%	<2,000 kg
Asahi	100%	0
BASF Corporation	100%	NA
Clariant	NA	NA
Daikin	100%	0
DuPont	99%	90 (Precursor release is CBI)
3M/Dyneon	100%	0
Solvay Solexis	>99.9999%	0

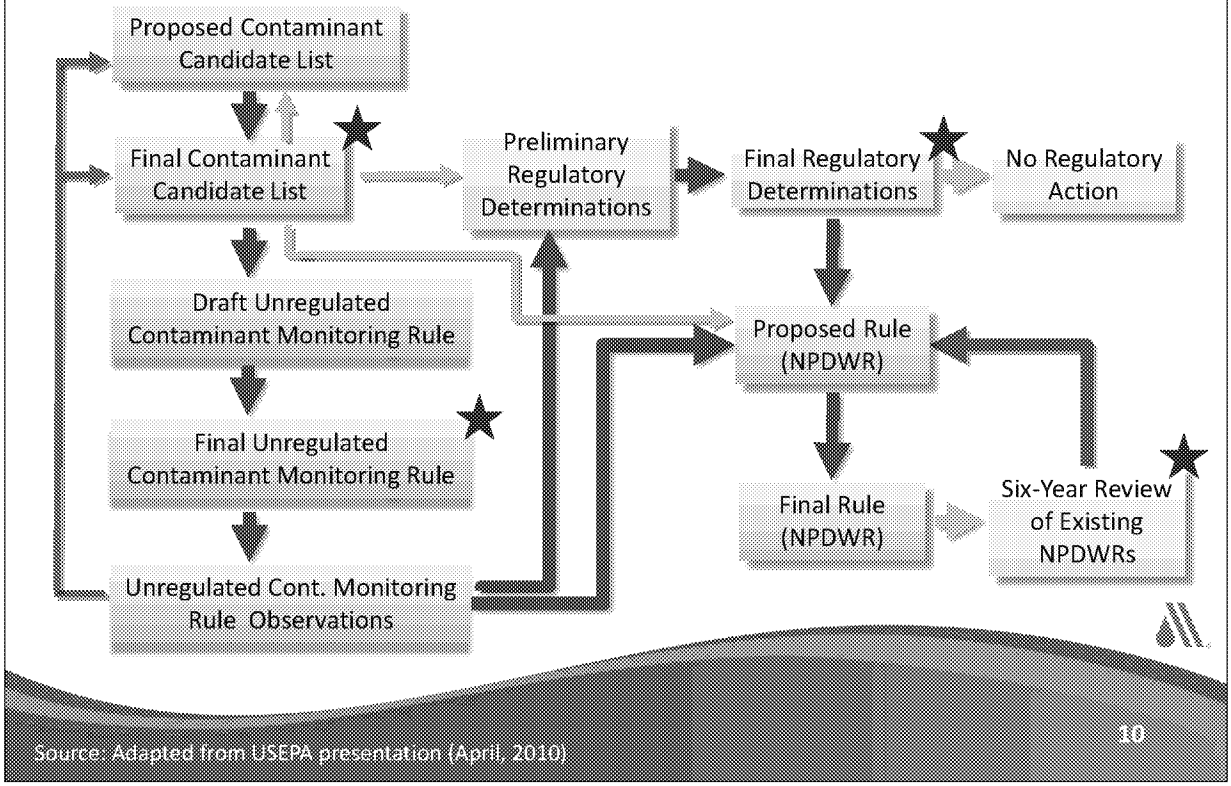
Source: https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/20192015-pfoa-stewardship-program-2014-annual-progress#background

Baseline year 2006
Latest report 2014 for 2013
Global stewardship program
Eliminate production by 2015



Baseline year 2006
Latest report 2014 for 2013
Global stewardship program
Eliminate production by 2015

SDWA Processes



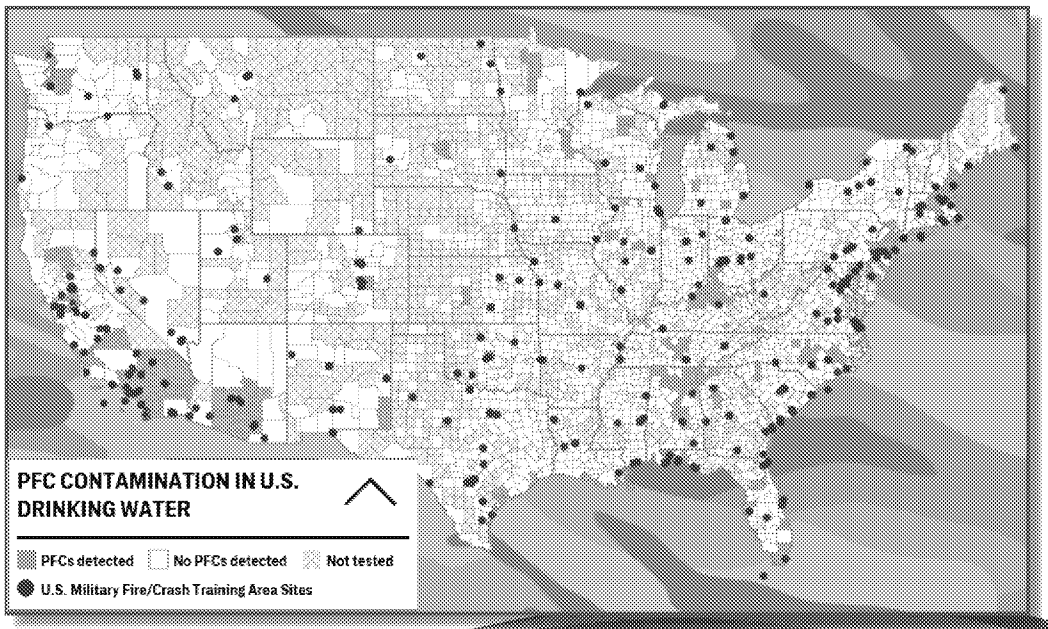
Source: Adapted from USEPA presentation (April, 2010)

Third UCMR

PFAS	MRL (ug/L)	Ref. Conc. (ug/L)	Number of Results	Number of results > MRL	Total Number of results > Ref. Conc.	Total number of PWSs with results	Number of PWSs with results > MRL	Number of PWSs with results > Ref. Conc.	% of PWSs with results > Ref. Conc.
PFOS	0.04	0.07	36,972	292	124	4,920	95	46	0.9%
PFOA	0.02	0.07	36,972	379	32	4,920	117	13	0.3%
PFNA	0.02	NA	36,972	19	- -	4,920	14	- -	- -
PFHxS	0.03	NA	36,971	207	- -	4,920	55	- -	- -
PFHpA	0.01	NA	36,972	236	- -	4,920	86	- -	- -
PFBS	0.09	NA	36,972	19	- -	4,920	8	- -	- -

PFOS and PFOA on CCL3

DOD Actively Searching



Source: Adapted from "Poisoning the Well" The Intercept, December, 2015. https://theintercept.com/2015/12/16/toxic-firefighting-foam-has-contaminated-u-s-drinking-water-with-pfcs/)

PFOS and PFOA on CCL3

EPA Health Advisories

- PFOA and PFOS
- 70 ng/L
- Individual or cumulative exposure
- Short-term exposure

What Changed?

Provisional Advisory

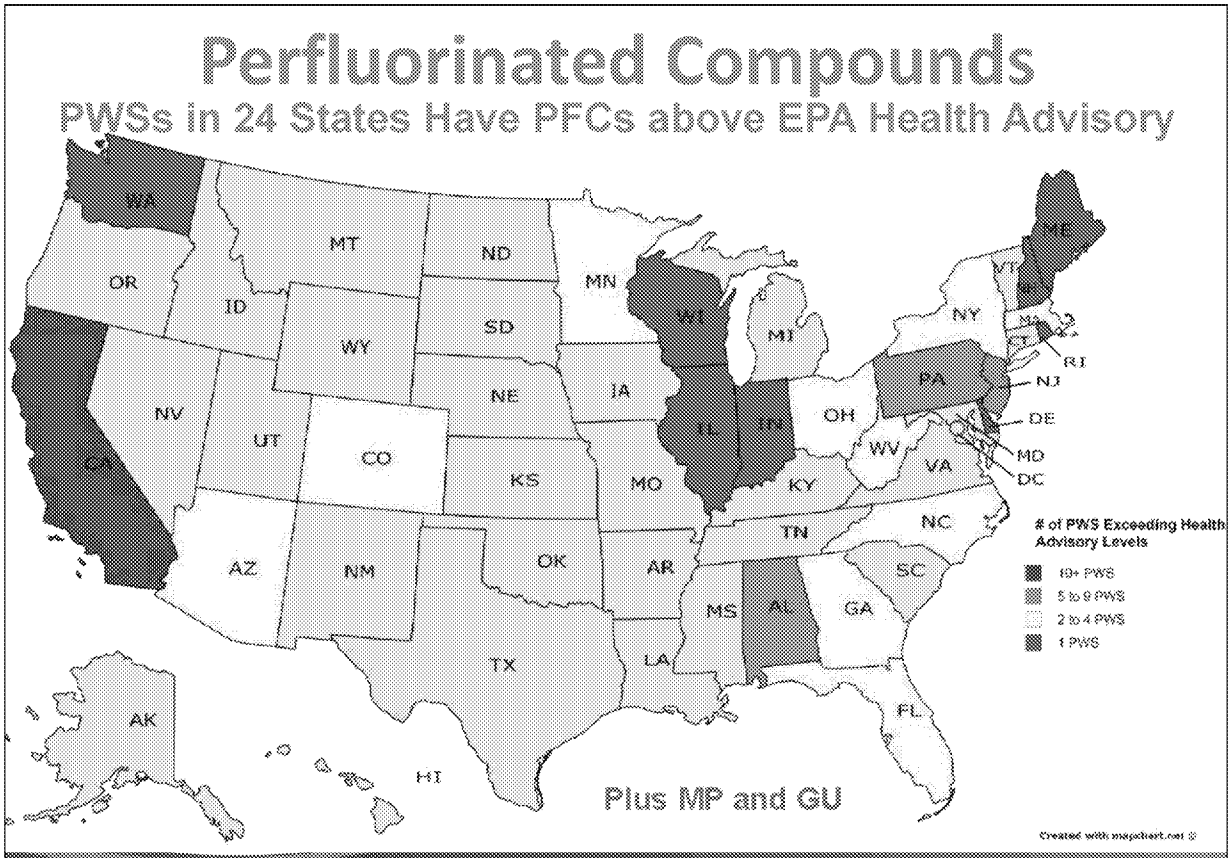
- BMDL10 in the Lau et al. (2006) study was 0.46 mg/kg/day for increase in maternal liver weight at term
- Drinking water intake of 10-kg child consuming 1 L/day
- Uncertainty factor of 2430 to cover differences in the ways humans and rodents respond to the PFOA
- 20%relative source contribution

Final Advisory

- Developmental endpoint with PFOA RfD of 0.00002 mg/kg/day
- Drinking water intake and body weight parameters for lactating women in the calculation of a lifetime HA
- Uncertainty factor of 300 to cover extrapolation from a LOAEL to a NOAEL, variability in the human population, and differences in the ways humans and rodents respond to the PFOA
- 20% relative source contribution

If PFOA or PFOS is Observed

1. Additional sampling to assess the level, scope and localized source of contamination
2. If levels are above 70 ng/L
   - Promptly notify their primacy agency
   - Provide consumers with information on levels, hazard, and risk reduction steps (use alternative water source)
3. Reduce exposure
   - Close well
   - Blend
   - Treatment (e.g., granular activated carbon)



Source: Adapted from "PFAS Monitoring in a Post Health Advisory World – What Should We Be Doing" (Andrew Eaton, WQTC, November, 2016)

EPA has set two health advisories (70 ng/L, cumulatively PFOS and PFOA)

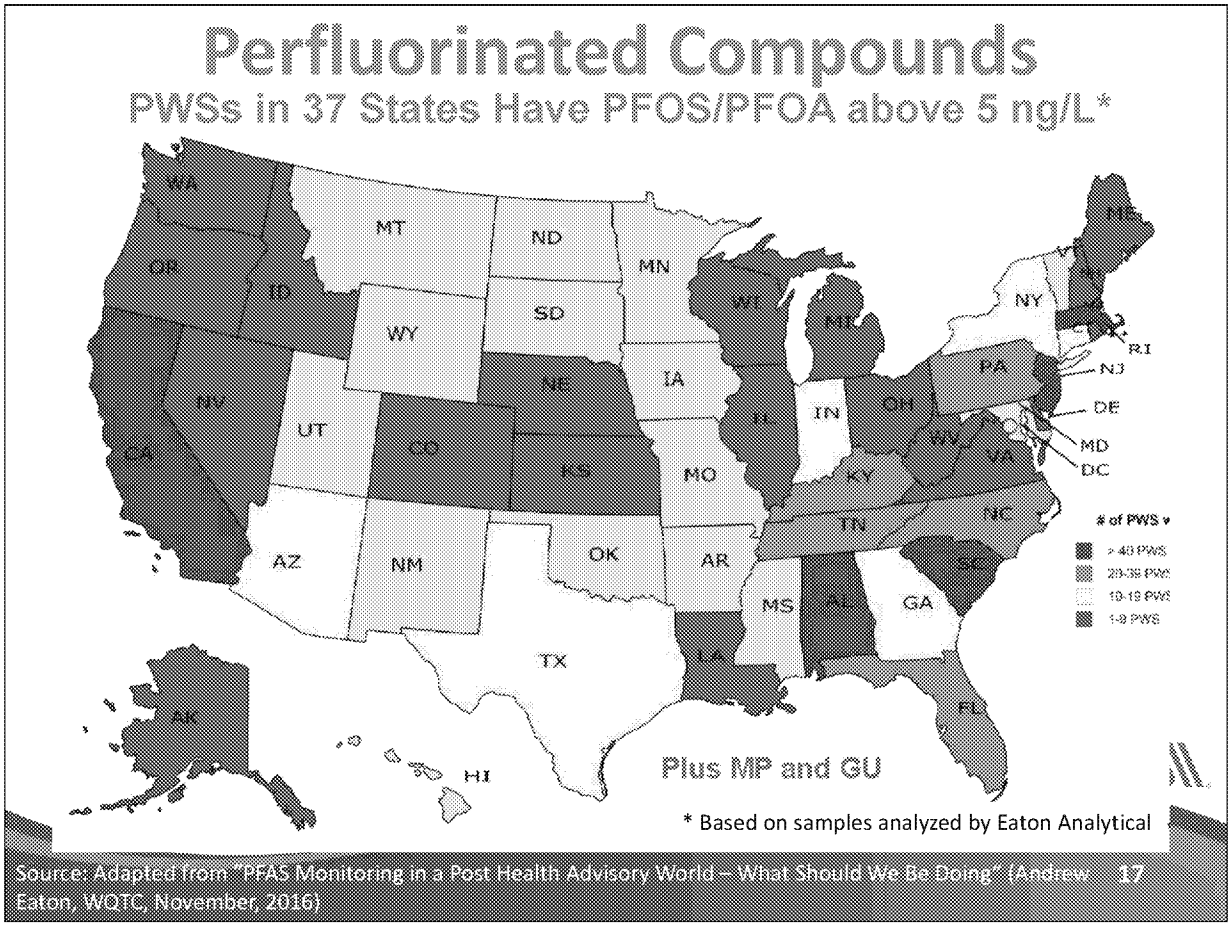
Presumably related compounds have similar health consequences and would also be summed.

UCMR3 included monitoring for six perfluorinated compounds … EPA Method 537 can quantitate 12.

Manufacturers transitioned to other related compounds with similar chemical functionality.

DOD is currently monitoring for 24 compounds.

Individual states, like VT, NJ have set or are contemplating lower advisory levels.



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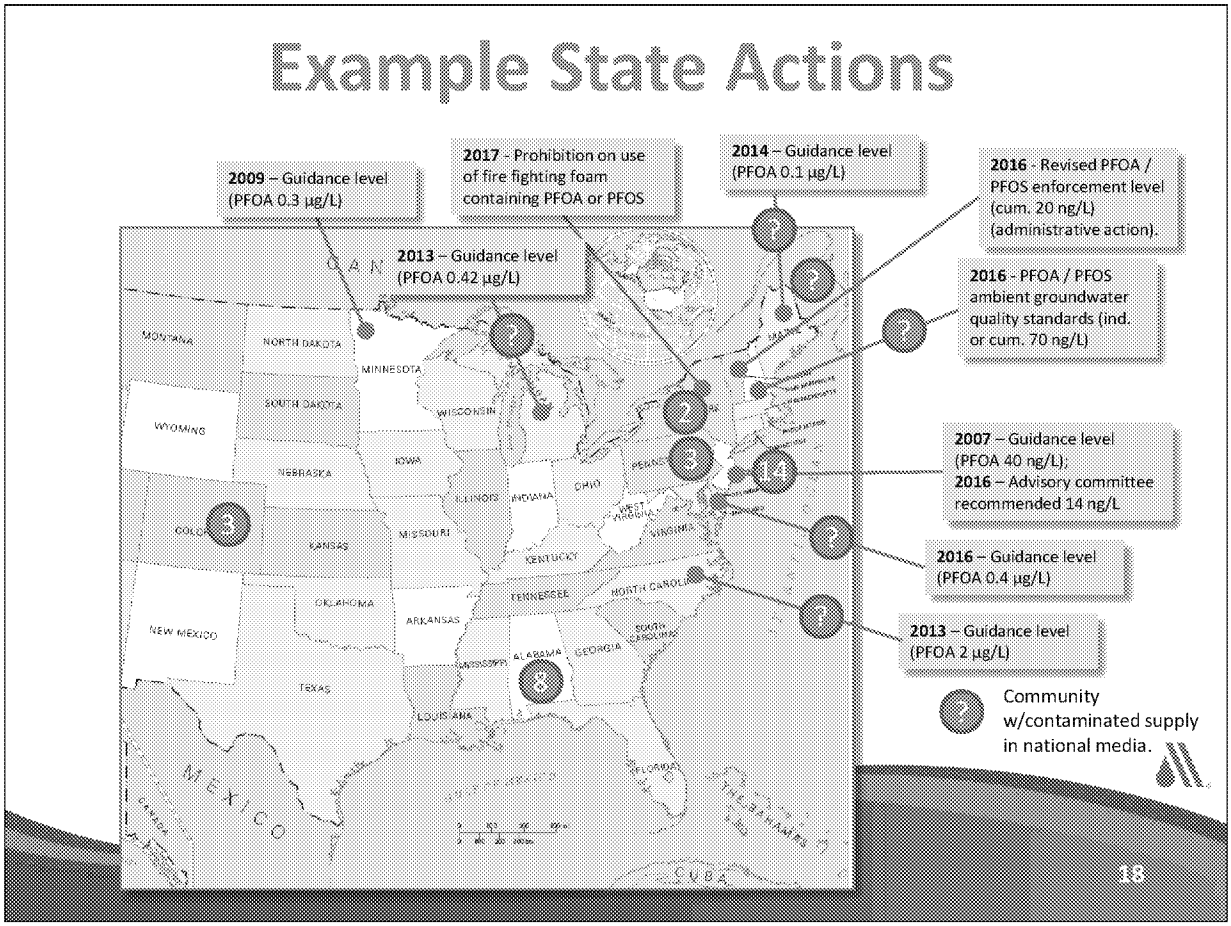
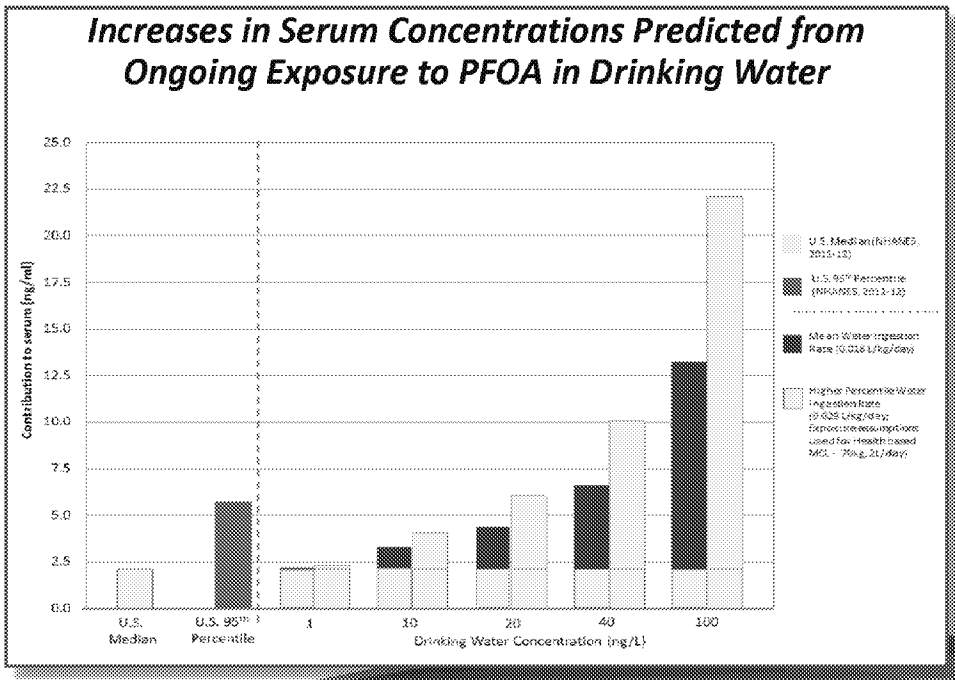


NY prohibition on FFF - http://www.dec.ny.gov/regulations/104968.html

NH GW - http://www.des.nh.gov/media/pr/2016/20160531-pfoa-standard.htm

MN, Historical NJ - https://en.wikipedia.org/wiki/Perfluorooctanoic_acid#cite_note-17

Health Advisory Low Enough?



Source: New Jersey Drinking Water Quality Institute Health Effects Subcommittee, Health-based Maximum Contaminant Level Support Document: Perfluorooctanoic Acid (PFOA), Sept. 2015.

19

Recommendation in NJ is for a 14 ng/L MCL based on relative liver weight and lifetime cancer risk of 10^-6

Deciding to Regulate

… The Administrator shall, … determines that— (i) the contaminant **may have an adverse effect on the health of persons**;

(ii) … known to occur or there is a **substantial likelihood that the contaminant will occur** …

(iii) …presents a **meaningful opportunity for health risk reduction** …

…**Use of science** in decision making.

… shall ensure … presentation of information on public health effects is comprehensive, informative, and understandable. …

(C) **Health risk reduction and cost analysis**.— …

(II) Quantifiable and nonquantifiable health risk reduction benefits for which there is an actual basis in the rulemaking record …

(III) Quantifiable and nonquantifiable costs for which there is a factual basis in the rulemaking record

… analysis of the health risk reduction benefits and costs likely to be experienced as the result of compliance with the treatment technique and alternative treatment techniques that are being considered, …

Citation: Safe Drinking Water Act Section 1412(b)(1)(A)